

CRUISE REPORT

Fisheries Agency of Japan Charter Vessel

Anyo Maru No. 22

Cruise No. 87-01

Japan-U.S. cooperative longline survey for sablefish
and Pacific cod in the Aleutian region,
eastern Bering Sea, and Gulf of Alaska

12 May to 15 September 1987

INTRODUCTION

Since 1978 the Fisheries Agency of Japan, in cooperation with the U.S. National Marine Fisheries Service (NMFS), has conducted an annual longline survey in the northeastern Pacific Ocean off Alaska under terms of a bilateral fisheries agreement. Personnel from the Far Seas Fisheries Research Laboratory in Shimizu, Japan, the Japan Marine Fisheries Center in Tokyo, Japan, the Resource Assessment and Conservation Engineering Division and the Resource Ecology and Fisheries Management Division of the Northwest and Alaska Fisheries Center (NAFAC) in Seattle, Washington, and the Auke Bay Laboratory in Auke Bay, Alaska have cooperated in data collection operations and in various phases of data analysis.

The 1987 survey was conducted aboard the Anyo Maru No. 22, a Japanese commercial longline vessel chartered by the Fisheries Agency of Japan. As in previous years, the survey was directed primarily at assessing the abundance, size composition and biological condition of sablefish (Anoplopoma fimbria) and Pacific cod (Gadus macrocephalus) stocks, along the continental slope between depths of 100 and 1,000 m. These surveys have provided 10 consecutive years (1978-87) of data for the Gulf of Alaska and Aleutian region, and 6 years (1982-87) of data for the eastern Bering Sea. The results of those surveys have been used most notably to monitor the relative abundance of sablefish stocks.

ITINERARY

12 May Departed Shioyama, Japan.

13-16 May In transit to western Aleutian Islands.

17 May-18 Jun Surveyed 31 stations in the Aleutian Islands and eastern Bering Sea.

19-21 Jun In port, Dutch Harbor, to exchange U.S. scientist and resupply vessel.

22 Jun-21 Jul Surveyed 29 stations in the eastern Bering Sea.

22-23 Jul In port, Dutch Harbor, to exchange U.S. scientist and resupply vessel.

24 Jul-15 Aug Surveyed 22 stations in the western Gulf of Alaska.

16-18 Aug In port, Kodiak, to exchange U.S. scientist and resupply vessel.

19 Aug-12 Sep Surveyed 25 stations in the eastern Gulf of Alaska.

13-14 Sep In transit to Seattle, Washington.

15 Sep Arrived Seattle; terminate cruise.

OBJECTIVES

1. Determine annual abundance and size composition of sablefish and Pacific cod stocks along the continental slope of Alaska.
2. Assess the stock condition of other major species caught during the survey, including Pacific halibut (Hippoglossus stenolepis), arrowtooth flounder (Atherestes stomias), Greenland turbot, (Reinhardtius hippoglossoides), rockfish (Sebastes spp.), Thornyheads (Sebastolobus spp.), and grenadiers (Macrouridae).
3. Tag sablefish and Greenland turbot throughout the cruise to study migration patterns.
4. Collect sablefish otoliths to determine the age composition of the stocks.

METHODS

The survey stations, gear, and sampling techniques used in 1987 were similar to those of previous years. The Anyo Maru No. 22 was a chartered 50.7 m (166 ft) commercial longline vessel carrying a crew of 26. One station was sampled per working day. At each station a 16 km (8.6 nmi) longline was set and retrieved. Each longline consisted of a series of 160 "hachis" (Japanese term for a length of longline), each 100 m (328 ft) long. A halibut anchor was attached at each end of the longline; a 3-kg (7 lb) rope-bound rock anchored each hachi. Surface buoy arrays and buoylines were attached at the beginning and end of the longline and one-third and two-thirds of the way along the line. Rope-bound rocks weighing 20 kg (44 lb) were attached near the intersections of the buoylines and groundline. Each hook was attached to a hachi by a 1.2 m (47 in) gangion, and each hachi had 45 hooks baited with squid for a total sampling effort of 7,200 hooks at each station.

Ideally, sampling would have ranged between 100 and 1,000 m (55-548 fm) at each station since those depths correspond to the bathymetric distribution of most of the sablefish biomass found in Alaskan waters. Because of bottom irregularities and the varied depth gradients found along the continental slope, it was often impossible to sample the entire depth range at all stations. The longline was set starting at the shallow end of the station and continued across deepening isobaths. At some stations in the Bering Sea the continental slope was so wide and the depth gradients so gradual that setting depths were alternated between those shallower than 400 m at one station and in deeper waters at the next.

Setting the gear usually took about an hour and hauling began after the end that was set initially had soaked for 3 hours. Total hauling time took 5-6 hours so that soak time varied from about 3 hours at the shallow end to 7-8 hours at the deep end.

Fish were tallied by species and hachi as the longline was brought aboard, then separated into baskets by species, weighed, and most species were measured (by sex and depth interval in the case of sablefish and Pacific cod). Depth of capture was recorded as the water depth under the vessel at the end of each fifth hachi. Pacific halibut were landed without gaffing, measured, and immediately released. Other species frequently measured were arrowtooth flounder, Greenland turbot, roughey rockfish (Sebastes aleutianus), Shortraker rockfish (S. borealis), shortspine thornyheads (Sebastolobus alascanus), giant grenadier (Albatrossia [Coryphaenoides] pectoralis), and Pacific grenadier (C. acrolepis).

At most stations sablefish were selected at random and held

in live tanks to be tagged and released. Only robust, uninjured fish were tagged. Viable Greenland turbot were also tagged.

Separate sablefish otolith samples for each research agency were collected throughout the cruise. The Japanese sample was composed of one otolith from each fish for a total of 10 fish per sex-centimeter and was stratified by area (west Aleutians, east Aleutians, Bering Sea, Shumagin, Chirikof, Kodiak, Yakutat, and Southeastern International North Pacific Fisheries Commission (INPFC) areas). The U.S. sample was composed of two otoliths from each fish for a total of 5 fish per sex-centimeter and was stratified by area (Aleutian region, Bering Sea, Shumagin, Chirikof, Kodiak, Yakutat, and Southeastern INPFC area). The U.S. sample was also stratified by depth in each Gulf of Alaska INPFC area (Figure 1).

The marketable portion of the catch was retained and processed for later sale in Japan. Proceeds from the sale of the fish served to defray the costs of the charter.

RESULTS

The Anyo Maru No. 22 sampled 107 stations during the 1987 survey (Figure 1). One preassigned station (No. 54) in the eastern Aleutian Islands was not sampled because of bad weather. The station positions and depth ranges sampled are listed in Table 1. Stations were located at positions similar to those sampled during previous cooperative longline surveys. A total of 17,070 hachis with a cumulative length of 1,707 km (992 nmi) were set. A total of 295,318 fish were caught on 768,150 for a 38.5% hook occupancy rate.

Sablefish and Pacific cod made up most of the catch (Table 2). Sablefish comprised 38.1% (112,641 fish) and Pacific cod, 27.9% (82,486) of the catch in numbers. Sablefish were most abundant in the Gulf of Alaska and Pacific cod were most abundant in the eastern Bering Sea. Catch rates and average weights of sablefish and Pacific cod are listed by station in Table 3. As many as 3,706 sablefish (station 87) and 3,840 Pacific cod (station 3) were caught at a single station. Highest catches of Pacific halibut were in the eastern Aleutian area and eastern Bering Sea. (However, extensive sampling was not conducted on the continental shelf where halibut are commonly found in the Gulf of Alaska during the survey period). Rockfish were most abundant in the eastern Gulf of Alaska. In all areas most of the rockfish catch was either shortraker or roughey rockfish. Almost all the Greenland turbot were caught in the Aleutian region or in the Bering Sea.

A total of 8,477 sablefish, 7.5% of all sablefish caught during the 1987 survey, were tagged (Table 2). Since 1978 the annual cooperative longline survey has tagged 135,476 sablefish.

Seventy-six previously tagged sablefish were recaptured during this year's survey. Three-hundred and twenty Greenland turbot were also tagged.

The U.S. otolith sample was collected from 3,239 sablefish.

Detailed analyses of survey results, including catch rates, size compositions, and estimates of relative population numbers and weights of Gulf of Alaska sablefish are being completed by NMFS scientists at the Northwest and Alaska Fisheries Center. A similar analysis is being performed for all major species and areas by the Fisheries Agency of Japan, Far Seas Fisheries Research Laboratory.

SCIENTIFIC PERSONNEL

12 May-15 Sep Yoshihiko Takeda, Investigator, Japan Marine Fisheries Center, Tokyo, Japan.
Hitoshi Mogi, Assistant, Japan Marine Fisheries Center, Tokyo, Japan.

12 May-19 Jun Harold Zenger, Fishery Biologist, NMFS/NWAFRC, Seattle, WA.

20 Jun-21 Jul Pierre Dawson, Fishery Biologist, NMFS/NWAFRC, Seattle, WA.

22 Jul-15 Aug Doyne Kessler, Fishery Biologist, NMFS/NWAFRC, Seattle, WA.

16 Aug-15 Sep Scott Johnson, Graduate student, University of Alaska, Juneau, AK.

For further information on the Japan-U.S. cooperative longline survey please contact either

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Table 1.--Position and depth of each station, Japan-U.S. cooperative longline survey in the Aleutian region, eastern Bering Sea, and Gulf of Alaska, 1987.

Station number	Position at start of longline	Position at end of longline	Depth start (m)	Depth end (m)
1	58°46.8' 177°33.0'W	58°48.6' 177°46.6'W	170	750
2	58°37.4' 176°40.5'W	58°33.8' 176°55.0'W	151	660
3	58°41.3' 176°01.0'W	58°35.4' 176°12.4'W	140	200
4	58°30.2' 175°40.1'W	58°29.7' 175°55.8'W	200	860
5	58°38.1' 174°21.6'W	58°31.8' 174°31.9'W	156	221
6	58°20.4' 174°19.7'W	58°22.0' 174°26.3'W	180	870
7	58°00.5' 173°51.0'W	57°52.8' 173°53.0'W	130	150
8	57°38.2' 174°10.6'W	57°45.5' 174°18.5'W	155	840
9	57°05.0' 173°27.2'W	57°07.8' 173°15.2'W	131	260
10	56°49.4' 173°21.2'W	56°56.8' 173°23.5'W	175	310
11	56°37.9' 172°24.4'W	56°40.6' 172°11.1'W	132	198
12	56°37.7' 172°21.2'W	56°30.7' 172°28.4'W	193	755
13	56°28.8' 171°26.0'W	56°25.7' 171°37.1'W	170	840
14	56°15.8' 171°10.8'W	56°23.8' 171°16.4'W	142	240
15	56°09.4' 170°39.6'W	56°07.8' 170°51.3'W	160	830
16	56°00.3' 169°52.2'W	56°08.3' 169°57.8'W	125	215
17	56°02.8' 169°37.4'W	55°58.4' 169°50.0'W	190	950
18	56°20.8' 169°09.0'W	56°16.5' 169°22.5'W	132	253
19	56°01.8' 168°09.4'W	56°04.3' 168°24.0'W	150	245
20	55°50.0' 168°50.0'W	55°54.8' 169°07.4'W	160	970
21	55°37.6' 168°15.6'W	55°33.0' 168°26.8'W	140	250
22	55°26.4' 168°02.2'W	55°22.6' 168°15.1'W	180	940
23	55°04.0' 167°00.7'W	54°58.5' 167°11.7'W	153	205
24	54°55.6' 167°10.0'W	54°48.3' 167°16.0'W	247	430
25	54°50.3' 167°18.8'W	54°45.5' 167°31.0'W	425	675
26	54°28.3' 167°05.2'W	54°21.0' 167°11.3'W	500	880
27	54°40.1' 166°25.7'W	54°32.7' 166°32.0'W	325	445
28	54°47.3' 166°14.7'W	54°40.7' 166°23.4'W	193	310
29	54°55.2' 166°02.7'W	54°49.4' 166°12.0'W	145	170
30	54°26.9' 165°40.0'W	54°29.4' 165°52.4'W	198	473
31	54°07.2' 166°22.3'W	54°14.8' 166°24.5'W	102	900
32	53°45.3' 167°19.2'W	53°45.4' 167°30.0'W	130	830
33	53°36.0' 168°17.8'W	53°38.7' 168°03.8'W	130	860
34	53°16.3' 168°49.6'W	53°22.3' 168°58.5'W	380	860
35	53°02.1' 170°08.5'W	53°06.8' 170°18.3'W	180	720
36	52°49.5' 171°14.7'W	52°49.2' 171°05.6'W	140	305
37	52°17.3' 173°30.7'W	52°25.2' 173°30.4'W	140	770
38	52°15.2' 174°50.4'W	52°21.3' 174°45.5'W	148	900
39	52°08.8' 175°37.5'W	52°12.2' 175°46.7'W	112	980
40	51°58.3' 176°26.6'W	52°03.8' 176°19.8'W	110	900
41	51°55.3' 177°35.0'W	51°56.5' 177°35.5'W	225	1060
42	51°45.4' 178°57.8'W	51°39.3' 178°48.7'W	235	740
43	52°03.0' 178°17.0'W	52°08.3' 178°23.3'W	130	870
44	52°15.7' 176°01.0'W	52°19.0' 176°11.9'W	105	585
45	52°40.3' 174°27.7'W	52°45.0' 174°17.5'W	103	940
46	53°04.5' 172°51.4'E	53°07.8' 172°40.6'E	98	6.6

Table 1 (Continued).--Position and depth of each station, Japan-U.S. cooperative longline survey in the Aleutian region, eastern Bering Sea, and Gulf of Alaska, 1987.

Station number	Position at start of longline		Position at end of longline		Depth start (m)	Depth end (m)	
47	52°32.3'	173°02.3'W	52°32.8'	172°49.0'W	120	810	
48	52°19.6'	174°14.4'W	52°14.0'	174°04.5'W	125	1000	
49	51°41.7'	175°49.5'W	51°36.0'	175°42.7'W	128	865	
50	51°45.7'	177°00.2'W	51°41.7'	177°10.5'W	120	940	
51	51°34.8'	178°06.7'W	51°42.6'	178°10.2'W	128	675	
52	51°19.0'	179°04.0'W	51°11.9'	179°01.0'W	100	900	
53	51°24.4'	178°36.6'W	51°21.5'	178°26.3'W	123	900	
54	NOT FISHED						
55	51°35.2'	177°38.8'W	51°31.0'	177°49.2'W	138	920	
56	51°32.8'	176°47.0'W	51°24.8'	176°51.4'W	180	900	
57	51°44.3'	175°59.4'W	51°36.1'	176°01.4'W	175	695	
58	51°52.4'	175°07.8'W	51°44.0'	175°07.5'W	170	590	
59	51°53.2'	174°19.5'W	51°48.3'	174°27.8'W	130	780	
60	51°55.4'	173°30.4'W	51°52.3'	173°42.2'W	138	770	
61	52°26.4'	170°17.0'W	52°19.8'	170°25.3'W	215	830	
62	52°35.3'	169°31.0'W	52°27.2'	169°31.5'W	148	570	
63	52°57.8'	168°09.2'W	52°50.9'	168°13.3'W	120	900	
64	53°11.7'	166°51.0'W	53°03.8'	166°54.3'W	218	880	
65	53°34.0'	165°41.8'W	53°76.4'	165°45.1'W	135	750	
66	53°44.4'	164°23.9'W	53°38.0'	164°32.7'W	140	830	
67	53°58.7'	163°14.2'W	53°51.8'	163°20.4'W	115	760	
68	54°05.1'	162°03.3'W	54°01.7'	162°15.4'W	115	860	
69	54°19.5'	161°02.8'W	54°11.5'	161°07.8'W	137	890	
70	54°21.9'	160°13.1'W	54°14.0'	160°15.9'W	147	645	
71	54°29.8'	159°15.2'W	54°22.3'	159°21.0'W	150	850	
72	54°38.2'	158°33.4'W	54°30.8'	158°39.4'W	129	830	
73	54°51.5'	157°44.4'W	54°43.5'	157°49.1'W	150	750	
74	55°13.1'	156°38.6'W	55°04.9'	156°43.6'W	270	930	
75	55°38.2'	155°51.4'W	55°30.2'	155°49.7'W	151	220	
76	55°44.8'	155°07.7'W	55°37.0'	155°11.7'W	162	650	
77	55°59.2'	154°37.6'W	55°52.8'	154°45.0'W	400	900	
78	55°59.2'	154°00.8'W	55°51.2'	154°03.3'W	200	735	
79	56°17.2'	153°00.0'W	56°13.2'	153°10.8'W	123	750	
80	56°32.7'	152°02.8'W	56°25.1'	152°09.5'W	140	1050	
81	57°07.0'	151°15.0'W	56°58.7'	151°18.6'W	200	835	
82	57°17.0'	150°31.3'W	57°25.0'	150°34.7'W	165	750	
83	57°38.3'	149°52.8'W	57°30.4'	149°53.3'W	365	760	
84	57°58.7'	149°08.8'W	57°50.5'	149°13.0'W	153	900	
85	58°17.4'	148°38.3'W	58°09.0'	148°38.6'W	170	930	
86	58°40.7'	148°18.3'W	58°32.3'	148°19.7'W	285	970	
87	59°08.3'	148°39.3'W	58°59.8'	148°39.5'W	145	740	
88	59°02.2'	147°53.7'W	58°53.8'	147°56.6'W	150	840	
89	59°17.0'	146°50.0'W	59°10.3'	146°58.0'W	195	930	
90	59°29.0'	145°26.9'W	59°27.0'	145°33.6'W	168	770	
91	59°31.7'	144°41.3'W	57°26.4'	144°53.0'W	185	840	
92	59°34.4'	143°36.1'W	59°27.0'	143°40.6'W	148	945	

Table 1 (Continued).--Position and depth of each station, Japan-U.S. cooperative longline survey in the Aleutian region, eastern Bering Sea, and Gulf of Alaska, 1987.

Station number	Position at start of longline	Position at end of longline	Depth start (m)	Depth end (m)
93	59°35.8' 142°31.3'W	59°29.2' 142°38.0'W	172	1030
94	59°74.0' 142°10.0'W	59°27.0' 142°23.7'W	220	905
95	59°02.8' 141°20.0'W	59°01.6' 141°35.0'W	275	870
96	58°41.3' 140°38.8'W	58°42.0' 140°52.5'W	225	900
97	58°28.6' 139°26.7'W	58°26.4' 139°38.6'W	186	820
98	58°08.5' 138°42.5'W	58°09.8' 138°54.0'W	178	850
99	57°52.1' 137°22.4'W	57°52.7' 139°33.2'W	183	860
100	57°31.0' 136°31.0'W	57°36.1' 136°39.3'W	187	935
101	57°11.3' 136°15.0'W	57°14.6' 136°24.5'W	240	900
102	56°50.3' 135°00.3'W	56°56.5' 136°06.9'W	250	850
103	56°24.0' 135°23.8'W	56°21.3' 135°38.3'W	154	350
104	55°58.0' 135°24.6'W	56°02.6' 135°35.3'W	223	830
105	55°32.5' 134°58.0'W	55°36.6' 135°08.5'W	215	850
106	55°20.4' 134°43.3'W	55°22.6' 134°55.0'W	242	910
107	54°52.9' 134°17.3'W	54°58.5' 134°25.7'W	228	930
108	54°27.8' 133°55.3'W	54°31.7' 134°03.7'W	238	980

Table 2: Numbers of fish caught and sablefish tagged, by area¹, Japan-U.S. cooperative longline survey in the Aleutian region, eastern Bering Sea, and Gulf of Alaska, 1987.

Species	Western Aleutians	Eastern Aleutians	Bering I	Bering II	Bering III	Bering IV	INPFC statistical areas					Total
							Shumagin	Chirikof	Kodiak	Yakutat	South-eastern	
Sablefish	2,450	8,946	2,017	3,292	2,296	1,086	16,523	11,804	19,181	23,552	21,494	112,641
Pacific cod	8,336	15,528	1,994	20,239	14,012	10,844	4,194	3,298	1,719	1,832	520	82,486
Pacific halibut	448	2,206	785	1,083	1,137	319	703	460	307	511	470	8,029
Arrowtooth flounder	537	580	897	3,285	1,513	1,508	1,155	2,063	1,756	697	926	14,917
Greenland turbot	433	661	1,288	992	782	759	3	1	--	--	--	4,919
Rockfish ²	991	1,066	138	63	67	78	801	333	530	1,568	1,578	7,209
Thornyheads	1,066	446	191	18	29	5	1,284	787	1,198	794	645	5,396
All species combined	14,261	29,433	7,310	28,972	19,836	14,599	24,663	18,746	24,691	28,954	25,633	235,597
No. of Sablefish tagged	631	1,162	295	730	335	131	1,030	655	1,149	1,071	1,288	8,477
No. of stations	10	16	5	14	9	6	10	7	10	11	9	107

¹ For location of areas, see Figure 1.

² Includes all species of rockfish (Sebastes spp.) combined; does not include thornyheads (Sebastolobus spp.).

Table 3.--Catch rates and average weight of sablefish and Pacific cod at each station, Japan-U.S. cooperative longline survey in the Aleutian region, eastern Bering sea, and Gulf of Alaska, 1987.

Station no.	Sablefish		Pacific cod	
	No. caught/ 100 hooks	Average round weight (lb)	No. caught/ 100 hooks	Average round weight (lb)
Bering IV				
1	2.83	6.8	19.68	11.1
2	1.40	5.3	17.47	10.9
3	0.00	--	53.33	10.8
4	7.24	6.4	9.86	9.1
5	0.22	4.4	39.31	8.4
6	3.39	7.2	10.96	12.5
Bering III				
7	0.00	--	11.03	12.3
8	4.88	8.1	10.50	9.6
9	0.00	--	40.06	10.2
10	2.04	7.5	35.97	8.8
11	1.54	4.9	33.88	11.4
12	4.82	6.0	5.03	8.4
13	12.69	6.7	15.75	8.2
14	0.17	6.0	30.13	10.6
15	5.75	6.7	12.28	10.5
Bering II				
16	0.00	--	21.26	11.2
17	7.07	6.9	21.03	10.3
18	1.31	3.1	27.60	8.3
19	0.15	5.0	43.68	8.1
20	1.63	6.1	20.06	10.8
21	0.10	4.4	48.63	9.3
22	0.21	4.4	26.35	7.4
23	2.97	4.4	20.88	10.3
24	10.47	5.4	28.43	6.6
25	6.06	4.8	0.04	8.4
26	4.86	5.0	0.00	--
27	3.36	5.2	0.35	6.4
28	7.13	4.9	17.25	7.4
29	0.42	2.9	5.56	7.3
Bering I				
30	9.38	4.5	2.78	9.3
31	1.04	5.5	8.79	9.2
32	2.75	4.8	6.85	7.1
33	1.57	5.4	8.49	7.7
34	3.28	5.5	0.10	8.2

Table 3 (Continued).--Catch rates and average weight of sablefish and Pacific cod at each station, Japan-U.S. cooperative longline survey in the Aleutian region, eastern Bering sea, and Gulf of Alaska, 1987.

Station no.	Sablefish		Pacific cod	
	No. caught/ 100 hooks	Average round weight (lb)	No. caught/ 100 hooks	Average round weight (lb)
Eastern Aleutians				
35	9.19	7.3	13.51	6.8
36	0.17	5.9	8.06	6.6
37	18.82	5.9	7.63	6.7
38	14.01	7.0	15.97	7.0
39	20.31	6.4	7.69	6.1
40	6.83	6.7	1.32	5.0
41	3.43	5.8	3.72	8.2
42	7.65	6.4	13.11	5.5
43	5.26	5.7	1.93	7.7
44	3.42	7.6	19.99	10.5
45	2.13	7.6	14.36	13.3
46	3.08	8.3	29.44	10.5
47	1.21	7.1	12.44	7.1
48	1.85	8.7	9.42	6.2
49	5.54	8.6	3.97	8.5
50	5.60	8.6	6.93	7.6
51	2.53	7.5	5.21	7.2
52	3.42	7.5	12.36	8.1
53	9.44	5.3	12.85	6.1
54		NOT FISHED		
55	6.54	6.2	29.11	7.6
56	3.53	4.8	10.03	7.5
57	7.93	5.4	17.36	6.8
58	4.90	5.4	18.65	7.9
59	2.29	6.7	19.13	8.9
60	4.68	6.6	14.97	7.8
61	4.51	5.5	10.56	5.5
Shumagin				
62	15.01	7.3	0.36	7.4
63	14.76	7.2	7.03	5.8
64	18.03	6.0	3.65	5.2
65	30.29	6.6	4.82	7.6
66	28.50	6.8	3.15	6.5
67	25.35	7.4	5.67	5.6
68	18.76	7.5	2.53	5.7
69	26.76	6.7	7.17	5.3
70	26.82	7.3	14.13	6.0
71	25.19	7.0	9.75	5.7

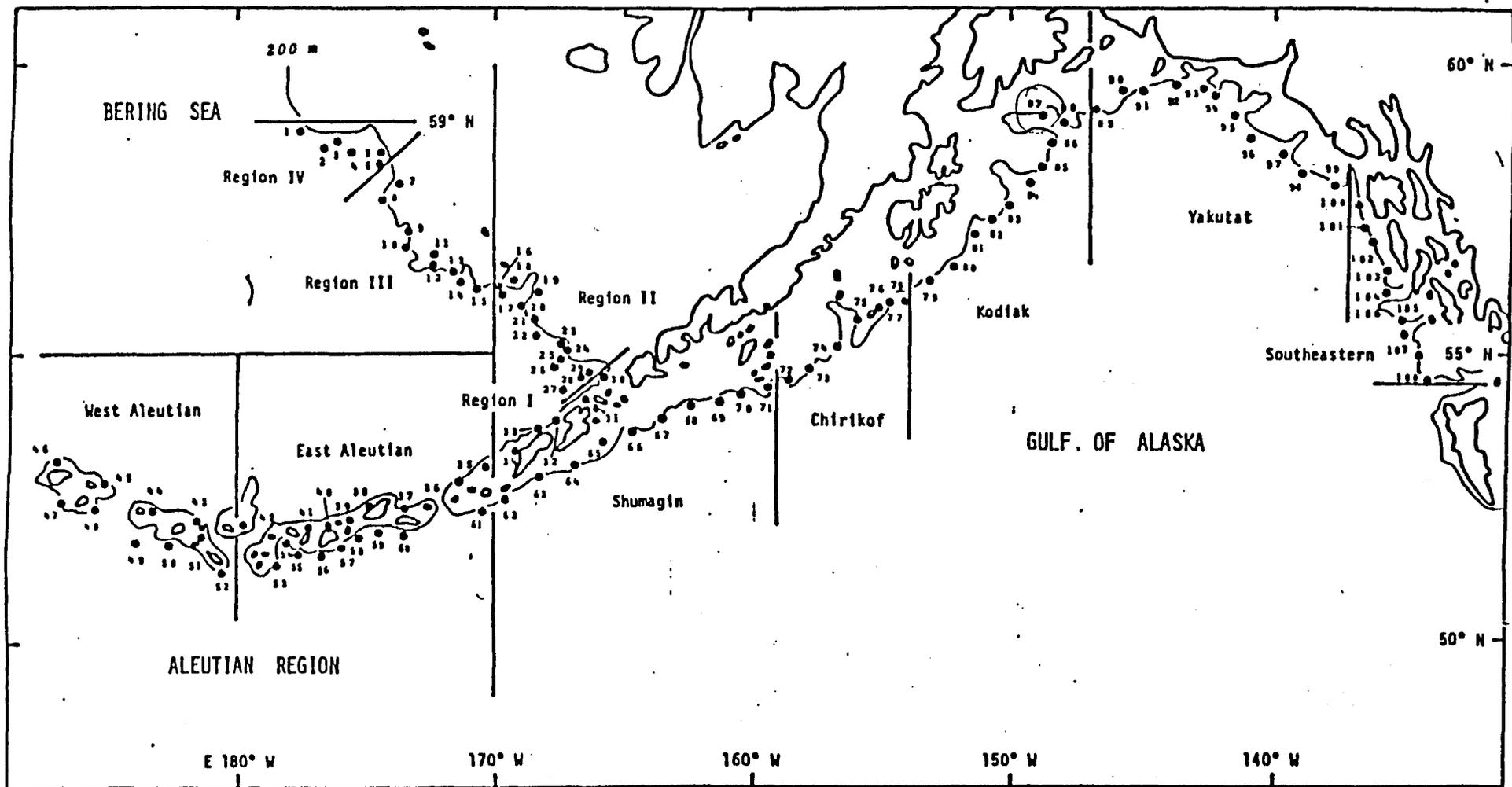


Figure 1.--Location of stations, Japan - U.S. joint longline survey in the Aleutian region, eastern Bering Sea, and Gulf of Alaska, 1987.

Table 3 (Continued).--Catch rates and average weight of sablefish and Pacific cod by station, Japan-U.S. cooperative longline survey in the Aleutian region, eastern Bering sea, and Gulf of Alaska, 1987.

Station no.	Sablefish		Pacific cod	
	No. caught/ 100 hooks	Average round weight (lb)	No. caught/ 100 hooks	Average round weight (lb)
Chirikof				
72	28.88	7.6	6.50	6.1
73	22.35	6.9	11.04	6.0
74	29.35	7.6	0.03	6.5
75	5.31	4.6	19.43	6.3
76	27.43	7.2	3.72	5.7
77	24.07	7.2	0.00	--
78	26.57	7.2	5.08	5.5
Kodiak				
79	33.19	7.7	0.92	8.9
80	14.36	7.5	2.03	5.4
81	25.60	7.0	1.19	4.5
82	23.76	6.6	2.15	4.8
83	18.63	6.8	0.00	--
84	31.21	6.0	4.64	4.3
85	21.38	6.8	1.76	4.6
86	22.56	7.1	1.64	4.3
87	51.47	6.0	7.18	4.8
88	24.25	7.2	2.36	4.9
Yakutat				
89	28.39	6.8	3.17	6.9
90	34.78	7.0	4.46	7.3
91	31.29	6.8	1.65	6.5
92	28.13	5.6	7.74	4.5
93	37.92	7.3	2.42	5.7
94	21.53	5.6	2.86	5.7
95	33.71	6.8	0.00	--
96	25.06	7.5	0.01	8.4
97	21.78	6.6	1.61	11.4
98	26.67	7.7	0.00	--
99	37.88	7.7	0.00	--
Southeastern				
100	42.43	5.4	0.04	7.2
101	44.76	7.6	0.03	6.2
102	43.56	7.7	0.08	7.1
103	21.21	5.1	5.82	6.9
104	36.00	6.5	0.07	6.2
105	31.71	6.7	0.85	5.8
106	32.00	6.6	0.08	6.2
107	23.19	7.3	0.07	5.1
108	23.67	6.9	0.18	4.8